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**United States Patent** [19][11] **Patent Number:** **5,773,417****Bonaventura**[45] **Date of Patent:** **Jun. 30, 1998**[54] **HUMAN SERUM ALBUMIN-PORPHYRIN COMPLEXES WITH THE ABILITY TO BIND OXYGEN AND THERAPEUTIC USES THEREOF**[75] Inventor: **Joseph Bonaventura**, Beaufort, N.C.[73] Assignee: **Duke University**, Durham, N.C.[21] Appl. No.: **906,828**[22] Filed: **Aug. 6, 1997****Related U.S. Application Data**

[63] Continuation of Ser. No. 279,371, Jul. 22, 1994, abandoned.

[51] **Int. Cl.**<sup>6</sup> ..... **A61K 38/00**; A61K 35/16; C07K 1/00[52] **U.S. Cl.** ..... **514/21**; 514/6; 514/185; 514/322; 530/302; 530/363; 530/385; 530/830; 424/529; 424/530; 424/531[58] **Field of Search** ..... 514/21, 6, 185, 514/322; 530/362, 363, 385, 830; 424/529, 4, 530, 531[56] **References Cited****U.S. PATENT DOCUMENTS**

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**ABSTRACT**

The invention is directed to human serum albumin-porphyrin (HSA-P) complexes which are capable of reversible oxygen binding and their uses. These complexes may be used in applications requiring physiological oxygen carriers such as in blood substitute solutions, or in applications requiring plasma expanders. Methods for the production of these complexes are provided. In a specific example, HSA-P complexes are shown to exhibit reversible oxygen binding. In another example, the HSA-P complex does not exhibit appreciable vasoactivity.

**42 Claims, 9 Drawing Sheets**